REMARKS

Claims 1-10 remain pending in the application. Per the Examiner's request, claims 4 and 9 have been amended to clarify what the phrase "other than the one" refers to. Support for the amendment to claims 4 and 9 can be found in at least paragraph [0008] of the patent application publication (US 2006/0235120). No new claims or new matter has been added through the present Amendment.

Claim Objections

Claims 4 and 9 stand objected to based on the phrase "R^2 is a monovalent hydrocarbon group, other than the one…" Specifically, the Examiner states that it is unclear what the phrase "…other than the one…" refers to, and requests appropriate correction. Therefore, to clarify the language of claims 4 and 9, the Applicants have amended claims 4 and 9 to specify that the phrase "…other than the one…" refers to the monovalent hydrocarbon group with 1 to 15 carbon atoms that describes R^2. That is, rather than describing R^1 as the Examiner inferred, the phrase "…other than the one…" instead refers to R^2. Therefore, claims 4 and 9 have been amended to clarify that R^2 is a monovalent hydrocarbon group with 1 to 15 carbon atoms, other than monovalent hydrocarbon groups having an aliphatic unsaturated bond. Support for the amendment can be found in at least paragraph [0008] of the patent application publication.

Claim Rejections

Claims 1-10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over United States Patent No. 3,476,826 to Millen (the '826 patent). The Applicants respectfully traverse this rejection on the basis that the Examiner has not established forth a *prima facie* case of obviousness. In view of original independent claim 1 and currently amended independent claim 9, the Applicants respectfully traverse the rejection over the '826 patent and submit that the present claims are both novel and non-obvious over the prior art.

To summarize the relevant standards that the Examiner must apply in performing an obviousness analysis of the present claims, 35 U.S.C. §103 forbids issuance of a patent when 'the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.'" *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1734, 82 USPQ2d 1385, 1391 (2007). As the Examiner is aware, the question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, (3) the level of skill in the art, and (4) secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966). See also *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. at 1734, 82 USPQ2d at 1391 (2007). Further, the MPEP provides seven examples of rationales for establishing a *prima facie* case of obviousness. Should the Examiner utilize any other methodology to establish obviousness, a commensurate level of specificity is required.

As the Examiner is aware, the Federal Circuit has recently confirmed the test for *prima facie* obviousness for chemical compounds "is consistent with the legal principles enunciated in KSR," and thus, "in cases involving new chemical compounds, it remains necessary to identify some reason that would have led a chemist to modify a known compound in a particular manner to establish prima facie obviousness of a new claimed compound." *Takeda Chem. Indus., Ltd. v. Alphapharm Pty., Ltd.*, Slip op. at 10 (Fed. Cir. 2007) (footnote omitted). In particular, the *Takeda* Court notes,

> [t]he test for prima facie obviousness for chemical compounds is **consistent with** the legal principles enunciated in **KSR**. While the KSR Court rejected a rigid application of the teaching, suggestion, or motivation ("TSM") test in an obviousness inquiry, the Court acknowledged the importance of identifying "a **reason** that would have prompted a person of ordinary skill in the relevant field to **combine the elements in the way the claimed new invention does**" in an obviousness determination. KSR, 127 S. Ct. at 1731. Moreover, the Court indicated that there is "no necessary inconsistency between the idea underlying the TSM test and the Graham analysis." Id. As long as the test is not applied as a "rigid and mandatory" formula, that test can provide "helpful insight" to an obviousness inquiry. Id. Thus, in cases involving new chemical compounds, **it remains necessary to identify some reason** that would have led a chemist to modify a known compound in a particular manner to establish prima facie obviousness of a new claimed compound. *Id.* (emphasis added)

The Applicants respectfully submit that the Examiner's position relative to obviousness of independent claims 1 and 9 over the '826 patent is deficient and violates the standards for establishing a *prima facie* case of obviousness set forth by *Graham*. That is, for the reasons set forth below, there is no reason that would have prompted a person of ordinary skill to combine the elements in the way the claimed new invention does.

First, the Examiner contends it would have been obvious to one of ordinary skill in the art to have combined the elements of the mixtures in Examples 1 and 2 of the '826 patent, corresponding to components (A), (B), (C), and (D) of the present invention, into one mixing process. The Examiner contends that such a mixing process would have been obvious because Example 1 teaches it is within the skill of the art to mix components (A) and (B) to obtain an organosiloxane-terminated polysulfide polymer useful as an adhesive additive, and Example 2 teaches it is within the skill of the art to mix components (B), (C), and (D) to obtain a high sulfur rank polysulfide polymer useful as a sealant. The Applicants respectfully disagree and submit that for the present invention involving a method for the preparation of a silicon-containing polysulfide-type polymer, specifically in the form of a polysulfide-type polymer having organosilyl groups, there is no reason that would have prompted a chemist to combine the elements in the way the claimed new invention does to establish *prima facie* obviousness of the method.

With respect to claims 1 and 9 of the present application, the '826 patent teaches a two-step reaction for preparing an adhesive additive that is an organosiloxane-terminated polysulfide polymer. Step 1 involves preparing a high sulfur rank polysulfide polymer from a conventional liquid low sulfur rank polysulfide polymer (column 4, lines 54-60). Step 2 then uses the high sulfur rank polysulfide polymer of step 1 as a starting material for preparing the organosiloxane-terminated polysulfide polymer. Thus, it is clear that the '826 patent teaches a two-step reaction for preparing the organosiloxane-terminated polysulfide polymer. In contrast, the present invention claims a method for the preparation of a silicon-containing polysulfide-type polymer,

specifically in the form of the polysulfide-type polymer having organosilyl groups, characterized by mixing components (A), (B), and (C), where the mixing is carried out in the presence of component (D). That is, the silicon-containing polysulfide-type polymer of the present invention is prepared by mixing components (A) to (D). By comparison, the '826 patent discloses multi-step, complex reaction processes that require additional process steps as compared to the present invention. That is, the '826 patent does not mix components (A), (B), and (C) in the presence of (D).

Moreover, example 1 of the '826 patent describes the reaction of vinyl triethoxy silane (corresponding to component (A) of the present invention) with a polysulfide polymer (corresponding to component (B) of the present invention) in the presence of a conventional catalyst, e.g. 2,2′-azobisisobutyronitrile. However, notably, there is no teaching or suggestion, i.e., no reason whatsoever, in the '826 patent that vinyl triethoxy silane can be reacted with the polysulfide polymer in the presence of (C) an organic base or ammonia and (D) sulfur instead of the conventional catalyst. In particular, the '826 patent provides no teaching of a catalyst for an addition reaction between vinyl triethoxy silane (corresponding to component (A)) and the polysulfide polymer (corresponding to component (B)) in the presence of sulfur (component (D)) because the '826 patent does not disclose mixing vinyl triethoxy silane and the polysulfide polymer in the presence of sulfur. Further, the Applicants respectfully submit that an addition reaction between vinyl triethoxy silane (corresponding to component (A)) and the polysulfide polymer (corresponding to component (B)) would not properly progress without components (C) and (D) of the present invention. In the '826 patent, there is no suggestion to replace the

conventional catalyst by combining components (A), (B), and (C) in the presence of (D). Therefore, there is no reason that would have prompted a chemist to combine the elements in the way the claimed new invention does to establish *prima facie* obviousness of the method for preparation of the new silicon-containing polysulfide-type polymer.

Secondly, the Examiner contends one would have combined components (A), (B), (C), and (D) into a single reaction mixture in order to obtain the expected result of a single polymer composition that is both high sulfur rank and organosiloxane-terminated so that the single polymer composition is effective as a sealant. The Examiner contends a sealant of a single polymer would have expected benefits over a polymer mixture. For the following reason, the Applicants respectfully disagree and submit that the proposed modification of the prior art would render the prior art unsatisfactory for its intended purpose.

As summarized in MPEP §2143.01.V, a proposed modification cannot render the prior art unsatisfactory for its intended purpose. That is, if the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

For the '826 patent, -SH groups at molecular terminals of the polysulfide polymer (corresponding to component (B) of the present invention) are necessary to cure the adhesive composition. In particular, the curing mechanism necessary to cure the adhesive composition of the '826 patent is described as

$$HS- + -SH + O \rightarrow -SS + H_2O.$$

If a majority of -SH groups at the molecular terminals of the polysulfide polymer are instead capped with organosiloxanes, as in "a single polymer composition that is both high sulfur rank and organosiloxane terminated" (as stated in note 10 of the present Office Action), the adhesive composition of the '826 patent exhibits a completely different curing mechanism and will not cure effectively. Therefore, the proposed modification of the '826 patent would render the prior art invention unsatisfactory for its intended purpose since the adhesive composition will not effectively "increase[e] the adhesion of high sulfur rank polysulfide polymer based adhesive compositions to metal and siliceous substrates, such as aluminum and glass" (column 5, lines 10-13 of the '826 patent).

Thirdly, as the Examiner is aware, "[t]he rationale to support a conclusion that the claim would have been obvious is that all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yielded nothing more than predictable results to one of ordinary skill in the art." *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1734, 82 USPQ2d 1385, 1395 (2007) (emphasis added). Additionally, combining known prior art elements is not sufficient to render the claimed invention obvious if the results would not have been predictable to one of ordinary skill in the art. *United States v. Adams*, 383 U.S. 39, 51-52, 148 USPQ 479, 483-84 (1966). And, the mere fact that references can be combined or modified does not render the resultant combination [or modification] obvious unless the results would have been predictable to one of ordinary skill in the art. *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1734, 82 USPQ2d 1385, 1396 (2007) (emphasis added).

For the reasons set forth above, the Applicants respectfully reiterate that the method of mixing components (A), (B), (C), and (D) as claimed in claim 1 of the present application is nonobvious since the prior art recites multi-step, complex reaction processes, i.e., the new claimed method was not known in the prior art, and that one skilled in the art could not have combined the elements as claimed by known methods with no change in the functions of the respective elements. The Applicants also respectfully assert that the method of the present invention provides unpredictable results.

In particular, the methods disclosed for the preparation of Examples 1 and 2 of the '826 patent are expected. The methods of the '826 patent are expectedly inefficient, both because of the multiple steps involved and the expected potential of by-product generation.. Moreover, the method of the '826 patent does not unexpectedly make it possible to produce a silicon-containing polysulfide-type polymer in a single and simple reaction process. Rather, the '826 patent discloses an expected two-step reaction process. Therefore, the Applicants respectfully assert that the Examiner has used the present invention as a roadmap, i.e., as impermissible hindsight, to categorize the results of claims 1-10 as predictable and expected. If the method of mixing components (A), (B), (C), and (D) of the present invention was obvious at the time of invention, the inventors of the '826 patent would have already combined the components in a one-step reaction, e.g. perhaps in Examples 3 and 4 of the '826 patent. The Applicants respectfully submit, however, the '826 patent never discloses a one-step reaction product and the Examiner has only arrived at the proposed modification of the '826 patent by using the present application as a roadmap.

In view of the foregoing, the Applicants submit that independent claims 1 and 9, as well as claims 2-8 and 10 that depend therefrom, are both novel and non-obvious over the prior art including over the '826 patent. As such, the Applicants believe the application is now in condition for allowance, and allowance is respectfully requested.

This Amendment is timely filed; thus, it is believed that no additional fees are due. However, if necessary, the Commissioner is authorized to charge Deposit Account 08-2789 in the name of Howard & Howard Attorneys, P.C. for any additional fees or to credit the account for any overpayment.

Respectfully submitted,

HOWARD & HOWARD ATTORNEYS

July 28, 2008
Date

/David M. LaPrairie/
David M. LaPrairie, Registration No. 46,295
Howard and Howard Attorneys, P.C.
The Pinehurst Office Center, Suite 101
39400 Woodward Ave.
Bloomfield Hills, MI 48304-5151
(248) 723-0442